



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/914,699 | 08/14/2002 | Martyn Poliakoff | 2577/104 | 1008 |
| 2101 | 7590 | 07/12/2006 | EXAMINER | |
| BROMBERG & SUNSTEIN LLP 125 SUMMER STREET BOSTON, MA 02110-1618 | | | KEYS, ROSALYND ANN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1621 | |

DATE MAILED: 07/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/914,699 | POLIAKOFF ET AL. |
| | Examiner | Art Unit |
| | Rosalyn Keys | 1621 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 April 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 11 and 31-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 11 and 31-46 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Status of Claims

1. Claims 11 and 31-46 are pending.

Claims 11 and 31-46 are rejected.

Claims 1-10 and 12-30 are cancelled.

Response to Amendment

Specification

2. The objection to the specification is withdrawn since claim 6 has been cancelled.

Allowable Subject Matter

3. The indicated allowability of claim 11 is withdrawn in view of the newly discovered reference(s) to Mao (US 5,780,689). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 11 and 31-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun (US 6,046,373) alone or in view of Sun et al. (US 5,962,800) and further in view of Mao (US 5,780,689).

Sun teaches a process to convert oxygenates to olefins or ethers in the presence of heterogeneous catalysts, which have been modified (see entire disclosure, in particular column 1, lines 11 to 17). The catalysts include zeolitic and non-zeolitic molecular sieves (see column 2, line 1 to

Art Unit: 1621

column 5, line 26). The modification includes treatment with organic or inorganic acids (see column 3, line 66 to column 6, line 4). The temperature, pressure and WHSV are disclosed at column 7, line 47 to column 8, line 38. Representative oxygenates include, but are not necessarily limited to, lower straight chain or branched aliphatic alcohols, ethers, carbonyl compounds (aldehydes, carboxylic acids, carbonates, and the like), and also compounds containing hetero-atoms, such as, halides, mercaptans, sulfides, amines, and mixtures thereof (see column 7, lines 3-33). One or more diluents may be fed to the reaction zone with the oxygenate feed and may include, but are not necessarily limited to helium, neon, argon, krypton, nitrogen, carbon monoxide, carbon dioxide, water, hydrogen, long-chain paraffins, other hydrocarbons, aromatic compounds, and mixtures thereof (see column 8, lines 38-52). A variety of reactor systems may be used to practice the disclosed invention and include but are not necessarily limited to a fluidized bed reactor, a circulating fluid bed reactor with continuous regeneration, a riser reactor, a fixed bed reactor and a moving bed reactor (see column 8, lines 53-57). The molecular sieves and non-molecular sieves may also be combined, blended, mixed and/or admixed chemically, physically, or mechanically to produce catalysts suitable for use in this invention (see column 5, lines 19-26). Such mixtures may provide better catalytic performance and/or more desirable physical properties. Sun teaches that the process may be carried out in a liquid, supercritical fluid, a mixed vapor/liquid, or a mixed vapor/supercritical fluid phase (see column 7, lines 47-52). Sun teaches that when the process is carried out in such phases, different conversions and selectivities of feedstock-to product may result depending upon the catalyst and reaction conditions. Sun teaches that olefin products, particularly light olefins, will form, although not necessarily in optimum amounts, at a wide range of pressures, including but not limited to autogeneous pressures and pressures needed to maintain a super critical state (see column 8, lines 1-5). Sun teaches that when the oxygenate feed comprises mainly alcohols, ethers may become the major products under conditions not effective or sufficient to produce olefins (see column 8, lines 17-19).

Sun differs from the instant invention in that Sun prefers the oxygenate feed be contacted in the vapor phase, whereas the instant invention is carried out under supercritical conditions or at near-critical conditions for the fluid acting as solvent. However, Sun clearly suggests that his reaction may be carried

Art Unit: 1621

out in a supercritical fluid (see column 7, lines 47-49). The skilled artisan would have been motivated to carry out the reaction of Sun using supercritical conditions in order to obtain different conversions and selectivities of feedstock-to-product as taught by Sun (see column 7, lines 47-52).

Sun further differs from claim 36, in that Sun fail to teach the use of inert carrier as support for his catalyst.

Sun et al. teach that the performance of zeolitic catalysts and certain molecular sieve catalysts, in the preparation of light olefins from oxygenates, can be improved by using monolithic supports (see entire disclosure, in particular column 1, lines 18-59).

One having ordinary skill in the art at the time the invention was made would have found it obvious to utilize a monolithic support, as taught by Sun et al., as a carrier for the zeolites and molecular sieve catalysts of Sun, since Sun et al. teach that the use of said supports will improve the performance of the catalyst in the preparation of light olefins from oxygenates.

Sun further differ from the instant invention in that Sun do not specifically teach the use of a sulfonic acid for modification of their zeolites.

Mao teaches that one can enhance the surface acidity and increase the selectivity to alkenes by coating the surface of the zeolite with trifluoromethanesulfonic acid, as taught by U.S. Pat No. 4,847,223 and U.S. Pat. No. 4,873,392, or to ethers by incorporating the trifluoromethanesulfonic acid onto an acid form Y zeolite (see entire disclosure, in particular column 2, lines 3-31).

One having ordinary skill in the art at the time the invention was made would have been motivated to modify the zeolite catalyst of Sun with a trifluoromethanesulfonic acid as taught by Mao in order to enhance the surface acidity of the zeolite catalyst and to alter the selectivity to the desired product.

Response to Arguments

7. Applicant's arguments filed April 7, 2006 have been fully considered but they are not persuasive.

Art Unit: 1621

The Applicants argue that Sun 1 (US 6,046,373) neither teaches nor suggests that oxygenates can be converted to olefins in the presence of a catalyst and carbon dioxide without being exposed to electro-magnetic energy. It is therefore submitted that there is no motivation for the skilled person to modify the process disclosed in Sun 1 to convert oxygenates to olefins in the presence of a catalyst and carbon dioxide without exposing the oxygenate to electro-magnetic energy. It is therefore respectfully submitted that the process of the present invention is non-obvious with regards to the disclosure of Sun 1. This argument is not persuasive because Sun teaches modification of the catalyst in the presence of electromagnetic energy and not conversion of the oxygenates to olefins in the presence of electromagnetic energy. Nonetheless, even if Sun 1 taught conversion in the presence of electromagnetic energy, the instant claims would still not be patentable over the teachings of Sun 1 because the claims do not exclude the use of electromagnetic energy in their process.

The Examiner has considered Applicants arguments with respect to Sun 2 (US 5,925,800) but is not persuaded by the arguments because they are not directed to the issue of the use of a carrier, which is the teaching for which Sun 2 is relied upon. The use of supercritical fluids is taught by Sun 1. Further the Applicants are arguing the use of supercritical carbon dioxide, however, none of the claims disclose the use of supercritical carbon dioxide.

The Examiner believes that the instant invention is obvious over Sun 1 in view of Sun 2, for the reasons disclosed above.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosalynd Keys whose telephone number is 571-272-0639. The examiner can normally be reached on M-W & F 4-10pm; Th 5:30am-5pm; Sat 5:30am-10:30am.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1621

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rosalynd Keys
Primary Examiner
Art Unit 1621

July 9, 2006